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| 09/963,709 | 09/27/2001 | Tomoyuki Akiyama | 011272 | 1627 |

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| EXAMINER | |
|---|---|
| SINGH, DALZID E | |

| ART UNIT | PAPER NUMBER |
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| 2633 | |

DATE MAILED: 03/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/963,709 | AKIYAMA, TOMOYUKI | |
| | Examiner | Art Unit | |
| | Dalzid Singh | 2633 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 September 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-12* is/are rejected.

7)☒ Claim(s) *5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama et al (US Patent No. 6,661,974) in view of prior art Fig. 2 discloses by applicant.

Regarding claim 1, Akiyama et al disclose an optical time-division multiplex signal processing apparatus, shown in Fig. 72, comprising:

an optical dispersion part (91a) supplied with an optical time-division multiplex signal (see col. 1, lines 34-49), said optical dispersion part providing optical dispersion to said optical time-division multiplex signal;

an optical detector (PD) coupled optically to said optical dispersion part, said optical detector detecting said optical time-division multiplex signal from said optical dispersion part in a superposed state; and

a filter (BPF) connected to an output terminal of said optical detector, said filter filtering out an electric signal of a desired frequency band from an output electric signal of said optical detector.

Akiyama et al disclose the dispersion part for receiving optical time domain multiplexed (OTDM) signal as discussed above an differ from the claimed invention in

that Akiyama et al do not specifically disclose that the dispersion part also receive a clock signal. However, in optical time domain multiplexed signal it is well known to transmit clock signal. The prior art (Fig. 2) as disclosed by applicant shows a clock signal transmitted along with OTDM signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention as made to provide a clock signal along with the OTDM signal to be received by the dispersion part (91a). One of ordinary skill in the art would have been motivated to do this in order to perform timing adjustment or synchronization of data signal.

Regarding claim 2, in view of the rejection of claim 1, Akiyama et al disclose optical dispersion part (91a) having optical coupler having a first input end to which said optical time-division multiplexed optical signal is supplied and differ from the claimed invention in that Akiyama et al do not specifically disclose that the dispersion part comprise of a second input end to which an optical clock signal is supplied. However, the clock signal can be coupled to another end of the coupler as suggested by Fig. 2 of the prior art. For example, a second input end could be coupled prior to the dispersion part (91a) to receive the clock signal so that the dispersion part is able to receive both clock signal and the OTDM signal.

Regarding claim 3, Akiyama et al disclose that the dispersion medium is selected from any of a single-mode optical fiber, a diffraction grating and a prism (see col. 1, lines 40-49, Akiyama et al disclose that the dispersion is selected from dispersion shifted fiber or dispersion compensated fiber).

Regarding claim 4, as discussed above, the combination of Akiyama et al and the prior art of Fig. 2 shows clock signal is transmitted along with OTDM signal and differ from the claimed invention in that the combination does not specifically disclose the optical coupler includes a depolarization element at said second input end. However, it would have been obvious to an artisan of ordinary skill in the art provide to provide depolarization element to the second input end. One of ordinary skill in the art would have been motivated to do this in order to reduce polarization dispersion of the signal.

Regarding claim 6, as discussed above Akiyama et al disclose processing method of an optical time-division multiplex signal, comprising the steps of:

providing a chirp to each of an optical time-division multiplex signal (in col. 2, lines 51-65, Akiyama et al disclose that providing chirp); and

detecting a beat component formed between said optical time-division multiplex signal and said optical signal provided with respective chirp (as shown in Fig. 72, it would have been obvious that the receivers detect beat component of the signal by filtering a selective frequency).

Akiyama et al disclose the dispersion part for receiving optical time domain multiplexed (OTDM) signal as discussed above an differ from the claimed invention in that Akiyama et al do not specifically disclose a clock signal. However, in optical time domain multiplexed signal it is well known to transmit clock signal. The prior art (Fig. 2) as disclosed by applicant shows a clock signal transmitted along with OTDM signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time

the invention as made to provide a clock signal along with the OTDM signal. One of ordinary skill in the art would have been motivated to do this in order to perform timing adjustment or synchronization of data signal.

Regarding claim 7, Akiyama et al disclose an optical time-division multiplex signal processing apparatus, shown in Fig. 72, comprising:

an optical dispersion part (91a) supplied with an optical time-division multiplex signal (see col. 1, lines 34-49), said optical dispersion part providing optical dispersion to said optical time-division multiplex signal;

an optical detector (PD) coupled optically to said optical dispersion part, said optical detector detecting said optical time-division multiplex signal from said optical dispersion part in a superposed state;

a filter (BPF) connected to an output terminal of said optical detector, said filter filtering out an electric signal of a desired frequency band from an output electric signal of said optical detector; and

an envelope detector supplied with an output signal of said filter (in Fig. 47B, Akiyama et al shows eye diagram of the signal, therefore, it would have been obvious that the there is an envelop detector to detect maximum and minimum of the signal).

Akiyama et al disclose the dispersion part for receiving optical time domain multiplexed (OTDM) signal as discussed above an differ from the claimed invention in that Akiyama et al do not specifically disclose that the dispersion part also receive a clock signal. However, in optical time domain multiplexed signal it is well known to transmit clock signal. The prior art (Fig. 2) as disclosed by applicant shows a clock

signal transmitted along with OTDM signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention as made to provide a clock signal along with the OTDM signal to be received by the dispersion part (91a). One of ordinary skill in the art would have been motivated to do this in order to perform timing adjustment or synchronization of data signal.

Regarding claim 8, Akiyama et al disclose an optical time-division multiplex signal processing apparatus, shown in Fig. 72, comprising:

a first optical dispersion part (91a) supplied with an optical time-division multiplex signal and causing an optical dispersion therein;

a second optical dispersion part (91b) causing an optical dispersion therein;

a plurality of optical detectors (PD) each coupled optically to said first and second optical dispersion parts, each of said optical detectors receiving said optical time-division multiplex signal in a superposed state;

a plurality of band-pass filters (BPF) each provided in correspondence to one of said plurality of optical detectors, each of said band-pass filters filtering out an output signal of said optical detector corresponding thereto; and

a plurality of envelop detectors each provided in correspondence to one of said plurality of band-pass filters, wherein said plurality of band-pass filters have mutually different band-pass characteristics (in Fig. 47B, Akiyama et al shows eye diagram of the signal, therefore, it would have been obvious that the there is an envelop detector to detect maximum and minimum of the signal).

Akiyama et al disclose the dispersion part for receiving optical time domain multiplexed (OTDM) signal as discussed above an differ from the claimed invention in that Akiyama et al do not specifically disclose that the dispersion part also receive a clock signal. However, in optical time domain multiplexed signal it is well known to transmit clock signal. The prior art (Fig. 2) as disclosed by applicant shows a clock signal transmitted along with OTDM signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention as made to provide a clock signal along with the OTDM signal to be received by the dispersion part (91a). One of ordinary skill in the art would have been motivated to do this in order to perform timing adjustment or synchronization of data signal.

Regarding claim 9, the combination of Akiyama et al and the prior art Fig. 2 disclose plurality of band-pass filters (see Fig. 72 of Akiyama et al) and differ from the claimed invention in that the combination does not specifically disclose each of said plurality of band-pass filters has a pass-band tuned to a frequency of a beat component formed between an optical signal component included in said time-division multiplex optical signal and said optical clock signal. However, it would have been obvious to tune the frequency of the filter to a frequency of a beat component. One of ordinary skill in the art would have been motivated to do such in order to tune the filter to match the selective frequency component of the signal.

3. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama et al (US Patent No. 6,661,974) in view of prior art of Fig. 2 discloses by applicant and further in view of Shake et al (US Patent No. 6,587,242).

Regarding claim 10, Akiyama et al disclose an optical time-division multiplex signal processing apparatus, shown in Fig. 72, comprising:

a first optical dispersion part (91a) supplied with an optical time-division multiplex signal and causing an optical dispersion therein;

a second optical dispersion part (91b) causing an optical dispersion therein;

a plurality of optical detectors (PD) each coupled optically to said first and second optical dispersion parts, each of said optical detectors receiving said optical time-division multiplex signal in a superposed state;

a plurality of band-pass filters (BPF) each provided in correspondence to one of said plurality of optical detectors, each of said band-pass filters filtering out an output signal of said optical detector corresponding thereto; and

a plurality of envelop detectors each provided in correspondence to one of said plurality of band-pass filters, wherein said plurality of band-pass filters have mutually different band-pass characteristics (in Fig. 47B, Akiyama et al shows eye diagram of the signal, therefore, it would have been obvious that the there is an envelop detector to detect maximum and minimum of the signal).

Akiyama et al disclose the dispersion part for receiving optical time domain multiplexed (OTDM) signal as discussed above an differ from the claimed invention in that Akiyama et al do not specifically disclose that the dispersion part also receive a

clock signal. However, in optical time domain multiplexed signal it is well known to transmit clock signal. The prior art (Fig. 2) as disclosed by applicant shows a clock signal transmitted along with OTDM signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention as made to provide a clock signal along with the OTDM signal to be received by the dispersion part (91b). One of ordinary skill in the art would have been motivated to do this in order to perform timing adjustment or synchronization of data signal.

Furthermore, the combination of Akiyama et al and the prior art of Fig. 2 differ from the claimed invention in that the combination does not disclose a plurality of optical delay elements each coupled to said second optical dispersion part, each of said plurality of optical delay elements inducing a delay in an optical clock signal supplied thereto from said second optical dispersion part. However, providing optical delays to the optical communication system is well known. Shake et al is cited such well known concept. In Fig. 18, Shake et al show providing plurality of delay elements. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide plurality of delay elements to the system of Akiyama et al. One of ordinary skill in the art would have been motivated to do such in order to synchronize timing adjustment of the signal.

Regarding claim 11, the combination of Akiyama et al and the prior art Fig. 2 disclose plurality of band-pass filters (see Fig. 72 of Akiyama et al) and differs from the claimed invention in that the combination does not specifically disclose each band-pass filters have a substantially identical pass-band. However, it would have been obvious to

set the frequency of the filter to have substantially the identical pass-band. One of ordinary skill in the art would have been motivated to do such in order to tune the filter to match the selective frequency component of the signal.

Regarding claim 12, in view of rejection of claim 1, the plurality of optical delay elements are provided in correspondence to a plurality of channels in said optical time-division multiplex signal, and wherein each of said optical delay elements has a delay time set so as to form a beat signal between an optical signal of a corresponding channel and said clock signal with a frequency corresponding to said pass-band (if each delay element is placed in each branch before the detector (PD) of Fig. 72 of Akiyama et al, then each optical signal is delayed accordingly to the corresponding channel).

### *Allowable Subject Matter*

4. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ishikawa (US Patent No. 6,456,411) is cited to show method of setting signal wavelength in optical transmission system.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
March 4, 2005

M. R. Sedighian

**M. R. SEDIGHIAN**
**PRIMARY EXAMINER**